PRIVATE INDUSTRY COUNCIL
INDIANAPOLIS
The Workforce Investment Board for Marion County

Nov. 4, 2005

Mr. Ron Stiver
Commissioner, Indiana Department of Workforce Development
10 N. Senate Ave.
Indianapolis, IN 46204

Dear Mr. Stiver:

It is my pleasure to submit, on behalf of the members of the Economic Growth Region 5 consortium, the attached Occupation and Skill Shortages Report.

Since we were awarded the grant in mid-September, we have accomplished a number of activities identified in our application, including building regional capacity, engaging industry partners and participating in all of the SSI workshops. But most important, we were able to make some substantial observations and decisions about the industries in our region. We understand the occupational structure of our region and the demand and supply for those occupations better than before. There is much more work to do, but we have outlined the direction in which our expert advisors agree we should be moving. The four industries and 13 occupations are defined and described in the enclosed report.

We are forwarding this report to you electronically and will follow up with a hard copy that will include the six required original signatures and 13 occupational projection worksheets.

Thank you for your time and interest in our report.

Sincerely,

Joanne Joyce
President and Chief Executive Officer

The Indianapolis Private Industry Council is a business-led organization serving as advisor, advocate and agenda setter for workforce development by integrating resources and leveraging funding based on the needs of employers and job seekers.

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Strategic Skills Initiative Skills Shortage ID Report
Cover Sheet

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JEFF WILLIAMS	**HEALTHCARE**	**Director of Human Resources, Engineering and Business Development**	
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JOE TRIMPE	**LOGISTICS**	**Senior Recruitment Specialist**	
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Economic Growth Region 5

Strategic Skills Initiative

Occupation and Skills Shortages Report

Submitted
November 4, 2005

Economic Growth Region 5

Strategic Skills Initiative Occupation and Skills Shortages Report

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Attachment:

Occupational Projection Worksheets (Attachments 1–13)

Executive summary

Economic Growth Region 5 is Indiana's largest and most diverse region. The population of the area exceeds 1.7 million people, and its workforce is 856,000 workers. The area has a high labor force participation rate, as well as a large in-bound commuter workforce.

Because the region's economy is large and diversified, no single industry stands far above the others. Manufacturing employs the most workers – 105,000, or about 12 percent of the region's total employment. (Advanced manufacturing is believed to be about 88,000 jobs, or 83 percent of total manufacturing.) Health care services stands in second place with 101,000 jobs. The next-largest sectors in terms of jobs are retail and accommodations.

The employers of EGR 5 pay wages that exceed Indiana average wages for nearly every occupation, but trail the U.S. average. The average annual wage in EGR 5 in 2004 was $38,743, which exceeded the Indiana average annual wage by $4,054. There are two reasons for this difference: EGR 5 pays higher wages for most jobs, and EGR 5 has more of the industries that pay high wages. Manufacturing pays the highest average wage. The industry has few occupations paying very high wages, but it pays a higher wage to its production workers (who are the majority of the manufacturing workforce) than other industries pay to their rank-and-file workers.

Recent years have brought sharp changes to the region. Since the recession of 2001, manufacturing employment has diminished each year, and some sources expect the decline to continue. Because manufacturing is both the largest and best-paying industry, EGR 5 has a deep interest in the future of this industry.

There is more to the region than manufacturing, however. The health-care sector is growing steadily in both numbers and sophistication. A biotechnology sector is developing to link research to manufacturing to health-care provision. Transportation, particularly trucking, warehousing, air freight courier services and passenger air services, shows particular strength. Several others sectors in the region, while small, are growing. Motor sports is perhaps the best example of an emerging industry. Capitalizing on the Indianapolis Motor Speedway and the racing business it brings to the state, a strong effort is underway to draw racing teams, sanctioning bodies and custom racing shops to the area.

This report describes the economy of EGR 5 and details key industries. Within those industries, certain critical occupations are named and information about the supply of workers to those occupations is discussed. A case is made that 13 occupations in four industries are deserving of special focus for development efforts that will aid workers as well as promote the health of the industries and of the community.

The report finds that large labor shortages exist in the region and that some occupations are in chronic short supply. Turnover also is a problem for some occupations, as workers pass in and out of companies as through a revolving door. In addition, workers in some occupations lack basic work skills.

Although many occupations are in short supply, this report focuses on a small number of jobs that appear to have the most severe problems. These occupations are registered nurse, licensed practical nurse, nursing aide, allied health professional, supervisor, automotive service technician, machinist, welder, machine operator, chemical equipment operator, inspector and tester, truck driver and laborer.

Section I
Methodology

We adhered to the recommended methodology in this analysis. All questions in the *Research and Identification Guidebook* were considered and answered, and the report is organized in the recommended format. In a number of cases described below, we have revised the data for our region. This was done on the advice our regional employers and experts to more accurately reflect current conditions. Often the substituted data were provided directly by the experts.

This report employs numerous sources of data, insight and interpretation. In addition to the data provided by the Indiana Department of Workforce Development and the Indiana Business Research Center in the online data packets, we also have used data from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics dataset. Occupational staffing patterns for industries with suppressed data were established through use of the Bureau of Labor Statistics 2002-2012 Industry-Occupation Employment Matrix. For data on postsecondary graduations in Indiana, we obtained records from the Indiana Commission for Higher Education. This report also is informed by four earlier studies that had been commissioned by the Indianapolis Private Industry Council Inc. to investigate four separate industries or clusters in the region. These studies were launched in spring 2005. They represent an additional resource to inform our analysis. The availability of multiple data sets has helped to ensure that our conclusions are robust and relevant.

Briefly stated, the methodology was as follows:

1. We examined and ranked our region's diverse business sectors in terms of jobs, wages and relative strength in comparison to Indiana and the United States according to the latest data (2004 QCEW). At this stage, the 20 two-digit NAICS code categories were evaluated.
2. The comparisons were made again concerning the change in these factors over time.
3. Industries were looked at in two-digit, three-digit and four-digit NAICS levels to distinguish where whole industries are growing or declining, or where one or two subsectors are moving opposite to the rest of the industry.[1]
4. Local policy considerations were introduced. Sectors that are the focus of particular economic development efforts were identified.
5. The results of four detailed sector studies were introduced.
6. The multiple criteria were balanced to show which sectors rank highest overall and these were chosen as "key industries."
7. New data were obtained and the process was repeated to determine the critical occupations within each of the key industries.
8. Further community participation and guidance from industry experts were obtained to ensure local and regional support for the conclusions drawn from the data and the reports.
9. Findings were revised to agree more closely with the guidance of regional experts in each of the industries.

Trend analysis looked at two intervals. Most often, we compared conditions in 1994 to those of 2004. There is nothing particularly significant about 1994 as a base year, but the 10-year period provides a wide window for viewing change. One significant change that we know of during that decade was the recession of 2001, which affected our region profoundly – perhaps permanently. Therefore, we also have referred occasionally to changes in the interval from 2000 to 2004.

[1] Some of the analysis relied on smaller distinctions; e.g. NAICS 711212 is the specific industry code that distinguishes racetracks from the larger group of spectator sports encoded in NAICS 7112, which also includes professional sports teams.

Our report departs from pure reliance on trend data as the basis of forecasting. We believe current trends are likely to change, or to change to an unusual degree. For example, we expect great leaps forward in the motor-sports sector. This is not because we see a trend of growth, but because the Indiana Economic Development Corp. and the Indy Partnership are working to build a motor-sports cluster in the region, involving as many national and international racing teams as they can attract. With these leaders behind the cluster, we expect the unexpected. Our projections for this cluster exceed what appeared likely from recent trends.

Our report goes somewhat beyond the prescribed methodology for computing the demand side for occupations. We agreed with the recommended method; openings from growth and openings from replacement of *retiring* workers are two fundamental elements of job demand. But we believe replacement is a much greater factor than the data suggest. Six percent to 24 percent of workers will change positions in any year, and in lower-skill occupations this rate often exceeds 30 percent a year. Turnover leads to thousands of hires and millions of dollars in personnel expenses for employers. Therefore, we have revised the number of expected job openings caused by the departure of workers include higher turnover rates as well as retirements. The second factor that we introduced was skill upgrade for incumbent workers. The success of each company and of our targeted industries depends on workers keeping their skills up to date. Therefore, we discuss skills of incumbent workers as one more factor in the demand section.

We relied on our own calculations for some of the occupation calculations and projections. We plugged regional employment values into the Bureau of Labor Statistics' Industry-Occupation Employment Matrix 2002-2012 and computed the number of workers in various occupations at the four-digit NAICS level. This was done to supplement the occupational data provided in the data packet. Particularly, this was done to fill the gaps left by suppressed data, as in the case of NAICS 3254 – Pharmaceuticals. We did not find any cases in which the two sources wildly disagreed. But we found the extra computation useful in assessing the prospects for occupational growth – particularly in the advanced-manufacturing sectors, where overall growth is expected to be slight but certain sectors will have substantial growth.

Detailed information about occupations was assimilated from three basic sources. The BLS Occupational Outlook Handbook was our primary source. The Occupational Information Network O*NET Online was a complementary source that we used to flesh out the primary tasks of each occupation. This was especially important in two cases in which we have placed a number of occupations into groups. Finally, we listened to regional employers in site visits, interviews, focus groups and industry summits and kept a continual dialogue with them to ensure that they would approve the result.

One complication in our project was the overlapping definitions of industries and sectors in the report. A strength of our findings was the number of cases in which the targeted sectors relate to and interact with each other. A sophisticated new health product might be designed by the biotechnology subsector, produced by an advanced-manufacturing company, distributed by a logistics firm and ultimately used by the region's health-care providers. It is unclear whether this process would involve two distinct industries, or three, or more. The overlap made the data harder to analyze, but proved that we are dealing with clusters that are truly vital to the region.

Throughout the investigation we relied primarily on the excellent data packets provided at the SSI home page. The packets were very well prepared and, except for the suppressed data, highly satisfactory.

Section II
Selection and definition of key industries

The key industries and clusters selected for Economic Growth Region 5 are

- advanced manufacturing,
- health care and biotechnology,
- logistics and
- automotive and motor sports.

These four sectors combine to account for nearly a third of all employment in the region, and a larger share of the region's wages. Manufacturing and health care are the first and second sectors in terms of employment. Health care and logistics have a pattern of strong growth and are projected to continue growing. Automotive and motor sports is a field with untapped potential in this community that local and state officials are striving to develop. Manufacturing may grow only incrementally overall in this region in the coming years, but some subsectors in manufacturing will grow substantially. The large size of manufacturing and its historical importance in the community convinces us to stand by manufacturing despite its uncertain future.

1. Current employment and employment growth

Manufacturing and health care are the No. 1 and No. 2 sectors in terms of employment in EGR 5. Manufacturing has been in the No. 1 position for several decades, while health care overtook retail in 2003 in the second position. Together, manufacturing and health care provide 24 percent of total employment in the region.

Table II.1
Employment by Major Sector[2]
EGR 5, 2004

Industry	Employment	Industry	Employment
Manufacturing	**105,139**	Public Administration	41,989
Health Care	**101,868**	Professional	38,733
Retail	96,252	**Other services**	**27,477**
Accommodations & food	72,129	Information	18,423
Administrative Services	60,148	Real Estate	15,818
Educational Services	57,074	**Arts & Entertainment**	**14,108**
Construction	50,594	Management	11,405
Transportation	**48,799**	Utilities	4,905
Finance & Insurance	46,048	Agriculture	1,945
Wholesale	42,920	Mining	772

Source: QCEW data from STATS Indiana

Transportation and warehousing are in the eighth position among the 20 sectors. They employ 6 percent of all workers. The automotive cluster is not a distinct industry but fits in portions of other services and arts and entertainment. The "other services" category includes the mechanical aspect of automotive repair, while the arts and entertainment sector includes the management and promotion of racing and racing teams.

[2] In this and other tables, the targeted industries are bolded for emphasis.

Two other very large sectors are retail and accommodations and food. While their size recommends them as critical to the region, we have found that they are driven by and dependent on the rest of the economy. These sectors grow along with the rest of the economy, but do not drive further growth. Also, the low wages paid by these sectors (see Table II.5) and their lack of career-advancement opportunity make these industries poor candidates for the focus of the Strategic Skills Initiative in EGR 5.

Employment trends show a different view of the region. The mix of industries has not always been as it is now, and indeed has changed substantially in the past decade. We use the interval of time from 1994 to 2004 because it is the largest window of data that are readily available – showing the longest possible trend. Table II.2 shows the major industries ranked from fastest-growing to those that are in decline.

Table II.2
Percentage Employment Change by Major Sector
EGR 5, 1994 to 2004

Industry	Percentage Growth	Industry	Percentage Growth
Administrative Services	47.8	**Other services**	**13.0**
Management	41.8	Mining	10.0
Arts and Entertainment	**35.9**	Wholesale	9.3
Transportation	**32.7**	Information	8.0
Professional	32.3	Agriculture	7.9
Educational Services	30.6	Finance and Insurance	3.5
Construction	29.5	Retail	2.4
Real Estate	25.6	Public Administration	0.2
Health Care	**21.7**	**Manufacturing**	**-9.4**
Accommodations & food service	15.9	Utilities	-22.2

Source: QCEW from STATS Indiana

The region grew in employment by 13.8 percent during the period, and 10 of the industries grew faster than the overall regional economy. Overall U.S. employment grew by 14.9 percent. Although EGR 5 grew more slowly than the United States, eight of the 20 major industry sectors grew faster regionally than nationally. These are listed in Table II.3, along with several three-digit specific industries. Also shown are sectors that gained relative to the United States, by declining at a slower rate.

Table II.3
Comparison of EGR 5 and U.S. Employment Growth
1994-2004

NAICS	Industry	EGR 5 Growth	U.S. Growth
493	**Warehousing and storage**	**141.1**	**28.4**
488	**Support activities for transportation**	**84.5**	**26.6**
56	Administrative support	47.8	41.4
711	**Performing arts, spectator sports and related industries**	**44.7**	**-1.3**
55	Management services	41.8	12.2
621	**Ambulatory health care services**	**39.7**	**34.2**
71	**Arts, entertainment and recreation**	**35.9**	**29.7**
48-49	**Transportation and warehousing**	**32.7**	**11.6**
54	Professional, scientific and technical services	30.6	26.0
61	Educational services	30.6	26.0
53	**Real estate**	**25.6**	**16.8**
622	**Hospitals**	**14.9**	**12.5**
21	Construction	10.0	-8.8
11	Agriculture	7.9	1.4

339	**Miscellaneous manufacturing**	**2.2**	**-9.4**
332	**Fabricated metal products manufacturing**	**-9.4**	**-16.0**

Source: QCEW from STATS Indiana

The two fastest-growing, two-digit sectors are administrative services and management of companies. It is important to note that these sectors do not make a product of their own, but provide services to other kinds of companies. For example, administrative services include temporary employment agencies (NAICS 5613) that provide temporary workers to other businesses, including those in manufacturing. The success of these companies depends on the local economy. Employment agencies provide 5 percent to 10 percent of the manufacturing workforce. Therefore, the 47.8 percent increase in administrative support partially offsets the 9.4 percent drop in miscellaneous manufacturing.

The growth in administrative services is more than a shift caused by the NAICS classifications. Table II.4 shows the actual number of jobs by which the workforce grew or shrunk in each of the sectors. We see that administrative services grew by 19,455 jobs. Manufacturing lost 10,901 jobs during the same time. So even if manufacturing's entire decline was caused by reclassification (which is not the case), administrative services is a truly growing sector. Still, as was said earlier, the administrative-services sector depends on growth elsewhere in the economy; it does not stand on its own. Meanwhile, health care and transportation are two of the four fastest-growing sectors.

Table II.4
Numerical Employment Change by Major Sector
EGR 5, 1994 to 2004

Industry	Growth	Industry	Growth
Administrative Services	19,455	Real Estate	3,223
Health Care	**18,178**	**Other services**	**3,160**
Educational Services	13,366	Retail	2,212
Transportation	**12,029**	Finance & Insurance	1,537
Construction	11,525	Information	1,363
Accommodations & food service	9,887	Agriculture	143
Professional	9,448	Public Administration	100
Arts & Entertainment	**3,729**	Mining	70
Wholesale	3,656	Utilities	-1,398
Management	3,363	**Manufacturing**	**-10,901**

Source: QCEW from STATS Indiana

2. Current wages and wage trends

We note first that EGR 5 wages generally are higher than wages throughout Indiana, but lower than U.S. wages. The average annual wage for all workers in EGR 5 in 2004 was $38,743. That is $4,054 higher than the average Indiana wage, and $604 less than the U.S. average wage. Hence, we see that EGR 5 offers premium wages to Hoosiers. (Later findings will show that many Hoosiers commute to EGR 5 or migrate into the region to take advantage of the wage bonus for working here.) Table II.5 shows the average annual wages for EGR 5 for 2004 in each of the 20 major two-digit NAICS industries.

Table II.5
Average Annual Wages by Major Sector
EGR 5, 2004

Industry	Annual Wage	Industry	Annual Wage
Management	$75,265	Public Administration	$38,895
Utilities	$66,809	**Transportation**	**$37,775**
Manufacturing	**$58,594**	Educational Services	$35,197
Finance & Insurance	$56,572	**Arts & Entertainment**	**$34,114**
Professional	$52,762	Real Estate	$34,060
Mining	$50,640	Agriculture	$30,233
Wholesale	$49,681	**Other services**	**$26,629**
Information	$48,282	Administrative Services	$25,098
Construction	$42,375	Retail	$23,922
Health Care	**$38,530**	Accommodations & food service	$13,209

Source: QCEW from STATS Indiana

The highest wage sector shown in Table II.5 is management, followed by manufacturing. The 10 sectors on the left side of the table pay at or above the region's overall average annual wage. Those on the right pay less than the average. We note that the industry's average wage does not tell us all we need to know. Some industries with low overall wages include some very good-paying jobs. Wage rates for particular jobs will be discussed further in section III.

Concerning wage growth, the data are very unreliable without careful analysis. Sectors with high wages in the base year look bad despite improvement. Low-wage sectors may show a remarkable rate of wage growth yet remain low relative to other sectors. To make a more robust measure of wage growth, we selected industries that met three criteria: 1) the average wages grew by at least 25 percent between 1994 and 2004; 2) the dollar raise amounted to $10,000 or more; and c) the 2004 wage wa at least $40,000. We filtered all two- and three-digit wage data by these three criteria. Table II.6 shows the resulting collection of industries, which meet our definition of high wage-growth industry sectors.

Table II.6
High Wage-Growth Industries

NAICS	Industry
21	Mining
22	Utilities
23	Construction
31-33	**Manufacturing**
326	**Plastics & Rubber Manufacturing**
327	**Nonmetallic Mineral Product Manufacturing**
331	**Primary Metal Manufacturing**
332	**Fabricated Metal Product Manufacturing**
333	**Machinery Manufacturing**
334	**Computer & Electronic Product Manufacturing**
336	**Transportation Equipment Manufacturing**
339	**Miscellaneous Manufacturing**
42	Wholesale Trade
481	**Air Transportation**
488	**Support activities for transportation**
51	Information
52	Finance and Insurance
54	Professional, Scientific and Technical Services
622	**Hospitals**
711	**Performing Arts, Spectator Sports, Related Ind**

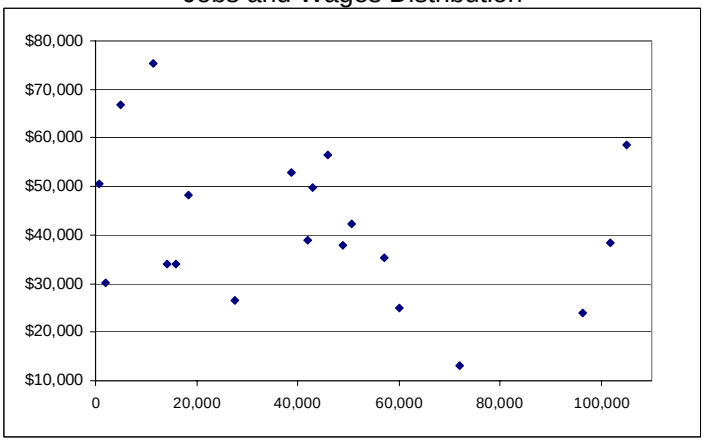
Source: QCEW from STATS Indiana

The targeted industries are a majority of the sectors that fit the criteria for high wage-growth. Another targeted subsector – ambulatory health services – did not make the list because its rate of growth was only 19.89 percent. It nonetheless paid an average annual rate of $49,123 in 2004.

3. Employment and wages: a combined view

So far in the process, we have looked at two factors: jobs and wages. The ideal target for economic development is an industry that pays high wages to many people. But because the two important characteristics do not rank the industries the same way, we need a way to see both variables at the same time. Chart II.7 provides that view.

Chart II.7
Jobs and Wages Distribution



Source: QCEW from STATS Indiana

Each point on the scatterplot chart represents both the wage level of an industry (vertically) and the number of jobs (horizontally). Points nearer the top represent industries that pay well. Points nearer the right-side margin represent industries that employ a lot of people. Points in the upper-right corner represent the attractive combination of good wages for many people. The chart shows one industry clearly in the upper right zone: manufacturing. The region's manufacturing payroll was more than $6 billion in 2004 or 18.4 percent of all earnings in the region. Health care is in the second-best position on the chart: a large employer paying overall wages near the regional average. The health-care payroll was $3.9 billion. Transportation and the automotive cluster fall into the center of the chart, outstanding in neither dimension. They are chosen as target industries because of their potential for imminent expansion. The two very high-wage industries, management and utilities, are shown here to be relatively small employers.

4. Projections

This section requires a greater emphasis on narrative than pure data. There are no clear data about the future. Nothing is certain and any forecast is only as good as the rationale behind it.

The simplest method of forecasting the economic future is to assume that conditions will stay as they are. This method is rarely correct, but often comes nearer the truth than forecasts based on short-term fluctuations. As a case in point we note that employment in the transportation equipment-manufacturing sector has declined by more than 7,000 jobs since 2000. A simple projection of that trend would predict

the entire demise of NAICS 336 (auto-parts manufacturing) in the region by 2016. No serious analyst expects this, and we are wary of projecting trends from short-term data.

It is extremely difficult to evaluate the performance and potential of various industries, sectors and clusters at this time. There are doubts as to the phase of the business cycle we are experiencing. International conflicts, oil prices and trade relations are all off the region's radar screen but likely to affect our growth.

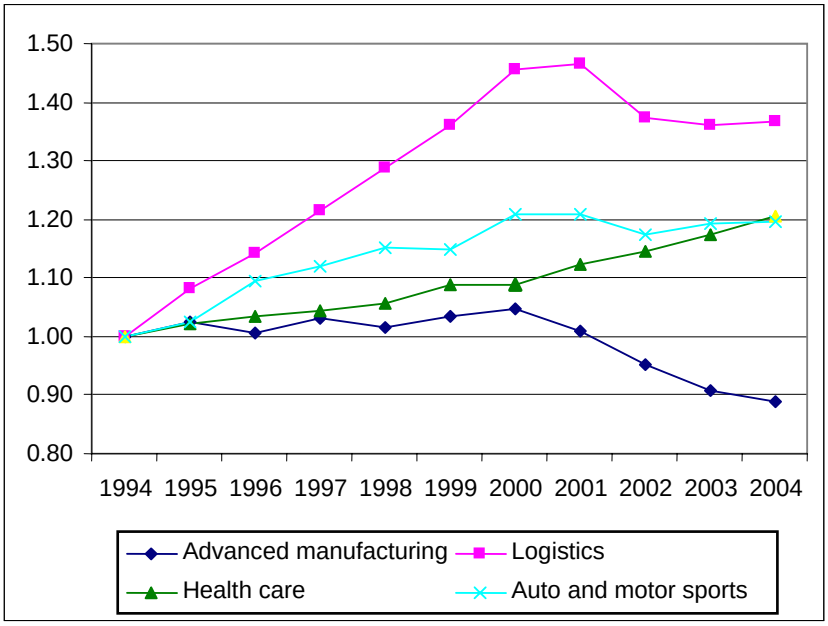
Advanced manufacturing and health care are the two largest sectors in the region. There may be significant changes in manufacturing, including further layoffs and plant closings. But there is no reason to suppose manufacturing employment will collapse entirely. We assume that these two sectors will remain at the top in the near and mid-term future.

Many of the industries in the region are dependent sectors and will grow as the whole economy grows, but no faster. NAICS 722 Food Services and Drinking Places, for example, are expected by the BLS to grow by 1.5 percent a year across the nation. This is exactly the expected rate of growth of the overall economy. The projection for food service in EGR 5 is slightly less than the national trend – 13.9 percent growth in 12 years or 1.15 percent annual growth. It is hard to expect change in the sector to be much different from the rate of overall change, since consumers spend a predictable share of their income on restaurant food. As the population gets more wealth, there will be more restaurant visits and more restaurant jobs. The last few decades saw an increase in the frequency of restaurant visits because of changing domestic habits, but that shift has ended and hereafter restaurant growth should parallel the economy.

Among the other sectors that are expected to grow at close to the overall rate of economic growth are construction, retail, information, other services and public administration. Several other sectors (mining; utilities; manufacturing; wholesale trade; finance and insurance; and management of companies) are expected to decline. Sectors expected to grow faster than the overall economy include transportation and storage; professional, technical and scientific services; administrative services; educational services; health care; and arts, entertainment and recreation. Recent forecasts hint that construction of new houses in the Indianapolis area may level off soon, but this is the only case in which state experts predict Indiana will depart from the national trends.

Chart II.8 displays the change in employment for the four targeted industries over the past 10 years. The 1994 employment for each industry is assumed to be 1.0 and subsequent growth and decline is shown as a percentage of the base year.

Chart II.8
Employment Variation, 1994-2004, 1994=1



Source: QCEW from STATS Indiana

The chart shows rapid growth for logistics, interrupted by the economic recession of 2001 and leveling off since 2001. Health care has grown steadily at a rate of about 2 percent a year, and seems unaffected by the recession. The auto-service sector, like health care, grew steadily. Advanced manufacturing has fluctuated throughout the period. Four straight years of decline since 2000 are most noticeable, but there were declines in 1996 and 1998 as well.

Chart II.8 provides a somewhat wider view than the simple assumption of no change. But we are mindful that the chart illustrates the past – not the future. We observe trends, but we do not know whether those trends will continue.

The prospects for growth in each industry depend on U.S. financial-market conditions, trade balances, innovations, consumer demand and other factors. To answer the question about future expectations, we turn to expert evidence gathered during the past few months. Consultant researchers were deployed by IPIC between May and October 2005 to investigate the prospects of important regional industries. Here is a summary of their findings for each of the targeted industries.

4.2 Logistics forecast

The logistics sector is expected to grow at the same rate as the overall national economy. The federal Bureau of Labor Statistics expects logistics to grow nationally by 807,100 jobs between 2002 and 2012. Fortunately for EGR 5, the greatest growth is expected among couriers, freight trucking and warehousing and storage – three sectors that already are large in this region. The warehousing sector has an intrinsic competitive advantage in EGR 5. Because of the location of Indianapolis at the hub of four major interstate highways and its proximity to America's population center, the region is an ideal choice for warehouse locations. Thanks to this innate advantage, nearly 80 large warehouses have been built in the

region during the past decade – and research suggests that 20 to 30 more will be built in the near future.[3] We expect warehousing in EGR 5 to equal or exceed its share of the overall national growth.

The fourth major subsector of logistics for our region – air transportation – is a distinct consumer good. People can travel in a variety of ways, and air travel competes with the alternatives. The forecast for this subsector is for growth of about 66,900 jobs nationally over 10 years. But because air travel is driven by consumer choice, EGR 5 does not necessarily gain when the nation gains overall. Indianapolis International Airport no longer is the hub of any major airline company (since the bankruptcy of American Trans Air), so the passenger air-transportation business here has little basis for strong growth. The data show a decline from 2002 employment of 7,190 to 5,013 in 2004. Various prognostications expect some recovery from the current low point, to a range of 6,000 to 7,000 jobs.

Table II.9
Logistics Sector Employment Forecast

Industry	Employment 2004	Employment 2012	Change
General freight trucking	11,184	13,030	1846
Warehousing & storage	6970	8,960	1990
Couriers	8,803	8,930	127
Air transportation	5,013	6,940	1927
Specialized freight trucking	2,779	2,340	-439
Support activities for air transportation	1,454	1,100	-354
Freight transportation arrangement	1,248	1,990	742
Support activities for road transportation	509	650	141
Packaging & labeling services	300		
Process & logistics consulting services	205		
Charter bus industry	197		
Other support activities for transportation	184	250	66
Messengers & local delivery	152	40	-112
Pipeline transport	127	120	-7
Support activities for rail transport	49		

Source: Indiana Department of Workforce Development projections and Logistics Cluster Workforce Study, Workforce Associates Inc., 2005.

Taken together, the logistics sectors shown here are expected to grow by about 5,927 jobs between now and 2012. That would equate to a net growth of about 740 jobs a year. Most of the growth will occur in general freight trucking and warehousing and storage.

4.3 Advanced-manufacturing forecast

Manufacturing always has been important to the region, and we are predisposed to continue to focus on manufacturing as a priority in the Strategic Skills Initiative. Despite employment declines since the peak of 2000, manufacturing still is the largest sector for employment, as well as the sector that provides the best wages to workers without college degrees. Focusing on manufacturing makes sense, however, only if it is expected to survive at or near its current levels.

The occupational projections provided by the Indiana Department of Workforce Development present a grim outlook for manufacturing generally and especially in NAICS 336 – a sector that is large and important in our region. But these data conflict with other forecasts, including that of the BLS for 2002-2012. That forecast anticipates growth in several of the industry sectors that IDWD says will decline. Table II.10 shows nine manufacturing subsectors in which the two sources disagree sharply.

[3] Logistics Cluster Workforce Study, Workforce Associates Inc., 2005.

Table II.10
Disparities between IDWD and BLS
Manufacturing Forecast, 2002-2012

NAICS	Industry	IDWD Indiana forecast	BLS U.S. forecast
3261	Plastic Products	5.9% decline	16.2% growth
3315	Foundries	7.9% decline	11.1% growth
3333	Commercial and Service Industry Machinery	4.4% decline	19.3% growth
3334	Ventilation, Heating, Air conditioning and commercial refrigeration equipment	2.3% decline	13.2% growth
3335	Metalworking machinery	33.6% decline	15.6% growth
3339	Other general purpose machinery	16.6% decline	17.7% growth
3362	Motor vehicle body and trailer	2.9% decline	11.6% growth
3363	Motor vehicle parts	19.8% decline	3.7% growth
3399	Other miscellaneous	4.2% decline	1% growth

Source: Employment and Output by Industry, 1992, 2002, and projected 2012, BLS; EGR 5_projections.xls, SSI data packet.

More than 20,000 jobs and $4 billion in wages are in the disputed sectors, so choosing the right path is critical to our region and our SSI plan. Our region will not necessarily follow the U.S. growth rate anticipated by the BLS. But we are puzzled as to why we would diverge so dramatically and so consistently from the U.S. growth trend. We will suffer loss in the traditional manufacturing sectors, but we also will share in the development of new manufacturing industries. The IDWD forecasts other Indiana regions to grow in the same sectors that it predicts will decline in ERG 5. For instance, NAICS 336 (transportation equipment) is forecast to decline in our region by 20.8 percent while it grows by 25.7 percent in EGR 11, 19 percent in EGR 7 and 9.8 percent in EGR 2 – the only region in the state with as much current strength in that sector as EGR 5.

Indiana University associate professor of economics Willard E. Witte, writing in August 2004, aptly explained why slow growth in manufacturing is almost a certainty:

> *Indiana is going to be an economy in which manufacturing employment will be a smaller and smaller fraction of the total. That simply is a reflection of the fact that manufacturing productivity grows more rapidly than productivity in non-manufacturing, particularly in the service industries.*[4]

Witte's point is that the relative diminution of manufacturing employment is caused by what the sector is doing right (becoming more productive) rather than anything it does wrong. As work becomes more productive, manufacturing firms can meet demand with fewer people working fewer hours. Ben S. Bernanke, President Bush's nominee to be Federal Reserve Board chairman, said this in a 2003 speech:

> *Strong productivity growth provides major benefits to the economy in the longer term, including higher real incomes and more efficient and competitive industries. But in the past couple of years, given erratic growth in final demand, it has also enabled firms to meet the demand for their output without hiring new workers. Thus, in the short run, productivity gains, coupled with growth in aggregate demand that has been insufficient to match the expansion in aggregate supply, have contributed to the slowness of the recovery of the labor market.*[5]

[4] Willard E. Witte, Kelley School of Business, news release, Aug. 23, 2004.
[5] Remarks by Ben S. Bernanke, a member of the Board of Governors of the Federal Open Market Committee, at the Global Economic and Investment Outlook Conference, Carnegie Mellon University, Pittsburgh, Pa., Nov. 6, 2003.

Productivity gains are transforming manufacturing in the same way that agriculture was transformed in the last century. Once the majority of Americans lived on farms, and the shift that saw the farm population reduced to only 2.5 percent of Americans was not a reduction in American eating habits but was almost entirely caused by gains in farm productivity. In both agriculture and manufacturing, foreign imports play a role in limiting our own growth. But it is a minority role, and 75 percent to 80 percent of products consumed domestically are produced here.

Witte and Bernanke explain why manufacturing employment is expected to grow more slowly than the overall economy. But they speak of *short-run* constraint on growth. Neither predicts continued rapid decline. The question before us is whether the IDWD forecasts or the BLS national forecasts are more reliable for EGR 5 in the near-term and long-term. The former appear to be based on the continuance of the trend – now in its fourth year – of substantial declines in manufacturing employment in EGR 5 and across Indiana and the United States.

The basis of our argument in favor of alternative projections is that EGR 5 has held on to more of its manufacturing employment during the past decade the United States. EGR 5's location quotient for transportation-equipment manufacturing is 1.88. We have a competitive advantage relative to the United States. We expect to continue holding the advantage and to capture at least a relative share of growth in the years to come. Jobs lost at old auto plants can be replaced with new jobs making parts for more profitable and less encumbered employers. Our research shows that this is happening already and is hidden by the data that show overall manufacturing employment going down.[6] In addition, we believe that EGR 5 is favorably positioned, with a greater share of its manufacturing employment in subsectors that are expected to grow, and less employment in subsectors that will decline. The BLS's forecast expects growth of 592,600 jobs in 25 subsectors, and loss of 483,600 jobs in 21 other subsectors.[7] The net change in manufacturing expected by BLS is 109,000 jobs nationwide over 10 years. Indiana's share and EGR 5's share of that change is determined by which industries are located here. Our region does not have a mix of industries identical to the United States overall. EDITORIAL COMMENT: THIS IS A REALLY GOOD PASSAGE.

If EGR 5 has more of the growing subsectors and fewer of the declining ones, then our manufacturing growth rate could exceed that of the nation simply by keeping up with the trends in each subsector. Fortunately, we find that this is the case. The subsectors with growth expectations include pharmaceuticals; motor vehicle parts; ventilation, heating, air conditioning and commercial refrigeration equipment; medical equipment; motor vehicle body and trailer manufacturing; plastics; machinery and fabricated metals. The region has a greater-than-one location quotient for each of these industries except plastics.

Finally, manufacturing employers in EGR 5 who responded to the ERISS Job Vacancy Survey are optimistic. Nineteen percent expect to grow significantly in the coming year, and only 2.7 percent anticipate a decline. The optimism in manufacturing is greater than that of every other regional sector but finance and retail. We therefore project that EGR 5 will capture a substantial share of growth in these industries.

4.4 Health forecast

The prospects for health care can be stated simply and unequivocally; the sector has been growing and will continue to grow. Each of the subsectors of health – hospitals, ambulatory care, residential facilities, medical manufacturing and biotechnology – is expected to grow at or above the general national trend.[8] This is confirmed by the IDWD projections and the BLS national forecast.

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[6] Industry Transformation: Growth and Change in Advanced Manufacturing in Central Indiana, Policy Analytics LLC, 2005.
[7] The U.S. Economy to 2012: Signs of Growth, Monthly Labor Review, February 2004.
[8] Indiana State and Regional Health Industries – A Workforce Gap Analysis, Thomas P. Miller and Associates, 2005.

4.5 Automotive and motor-sports forecast

The automotive and motor-sports sector provides the most interesting prospects for the future. With influential regional and state leaders championing the plan, there is a likelihood of great change in motor sports. About 8,800 people already work in motor sports-related jobs in the region. These jobs occur at sanctioning bodies such as United States Auto Club and the Indy Racing League as well as the Indianapolis Motor Speedway and other racetrack facilities. The goal is to attract the headquarters of U.S. and international racing teams, and then ultimately specialized machine shops that cater to the racing specialty. There is no expectation that the Indianapolis 500®, the Allstate® 400 at the Brickyard® or the U.S. Grand Prix™ will increase in scope, for these three events are already at a maximum.

The three events bring about $725 million to the region each year.[9] The rest of this cluster involves automotive services and the production and distribution of vehicle parts and supplies. These sectors will grow at the rate of the overall economy.

5. Location quotient assessment

EGR 5 is a large and well-developed economic community. The preceding analysis showed substantial activity in each of the 20 major industrial sectors except agriculture and mining. As the center of state government, Indianapolis has a large public-administration sector. But the location quotient for public administration is not large. Economic Growth Region 5 is more than the state capital, and the very large state administration represents only about 5 percent of the region's employment.

In each of the major industrial sectors, EGR 5 has the largest employment of any region in the state. Its manufacturing employment is in a virtual tie with EGR 2, but in all the other sectors EGR 5 has a substantial size advantage over every other region. Location quotient analysis is the prescribed method of assessing the balance of industries within a region. The location quotient does more than show balance – it also suggests where an industry is doing especially well. Table II.11 shows the location quotients for each of the 20 major industry sectors for EGR 5 relative to Indiana.

Table II.11
Location Quotients
Economic Growth Region 5, 2004

Industry	LQ	Industry	LQ
Agriculture	0.53	Real Estate	1.46
Mining	0.39	Professional, Scientific & Technical	1.52
Utilities	1.05	Management of Companies	1.41
Construction	1.14	Administrative Services	1.48
Manufacturing	**0.61**	Education Services	0.81
Wholesale	1.20	**Health Care**	**1.00**
Retail	1.00	**Arts, Entertainment & Recreation**	**1.04**
Transportation & Warehousing	**1.32**	Accommodations & Food Service	1.04
Information	1.31	**Other Services**	**1.10**
Finance & Insurance	1.54	Public Administration	1.08

Source: QCEW from STATS Indiana

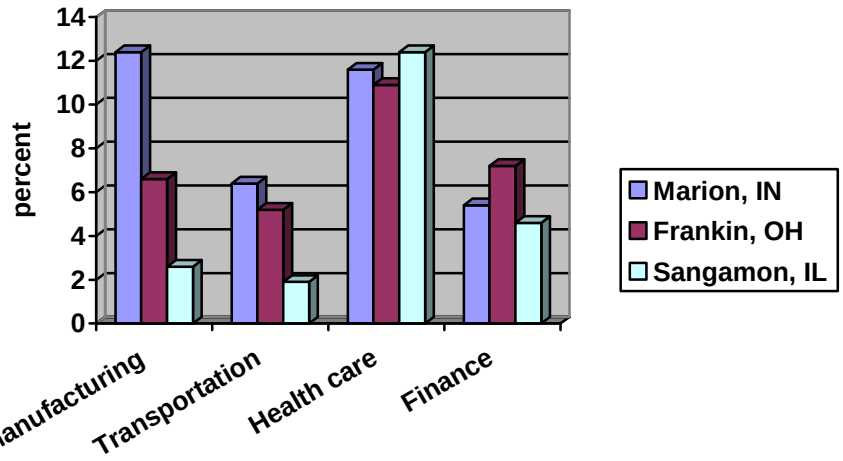
The table shows that EGR 5 has low location-quotient values for manufacturing (0.61) and education services (0.81). In all other sectors the location quotient is either balanced or significantly greater than one.

[9] Job Training and the Automotive and Motor Sports Industry in Central Indiana, Indiana University Center for Urban Policy and the Environment, 2005.

The location quotient is a valuable tool for comparing similar regions, but comparisons of EGR 5 with Indiana's other economic growth regions are problematic. As Indiana's only major metropolis, EGR 5 is different from the rest of the state. There are more specialized businesses leading to greater overall economic diversity. The denominator of the location quotient fraction is the sum of more diverse segments. Therefore the location-quotient ratios imply deficiencies where they do not exist.

An alternative means of assessing EGR 5 is by comparison to similar sub-state regions in other states. Chart II.12 compares Marion County with single counties in Illinois and Ohio. Sangamon and Franklin counties, like Marion County, contain the state capitals of their respective states. The chart shows that Marion County's manufacturing share of 12.4 percent is larger than the manufacturing share of either Ohio's or Illinois' capital city. The same is true for transportation and warehousing. The health-care sector, while slightly smaller than that of Sangamon County, is larger than that of Franklin County, Ohio.

Chart II.12
Three-County Comparison



Source: USA Counties IN Profile from STATS Indiana

This brief county-to-county analysis suggests that the region actually may be strong in cases in which the location quotient relative to Indiana implies weakness. A more thorough analysis would compile data for multi-county metropolitan areas of 1 million to 2 million people – similar to EGR 5's population of 1.7 million. If time allowed, we would sift the county data for all states contained in STATS Indiana and determine a set of five to 10 regions that are most comparable to EGR 5 in size and overt characteristics. We would assess EGR 5 against these benchmark communities to gain another perspective on the economic structure of the region. However, we feel confident in retaining manufacturing and health care as targeted sectors despite their low location-quotient values.

6. State and local economic development policies

The Indiana Department of Commerce Strategic Plan for Economic Development, released in early 2005, identifies four sectors of the regional economy as "stars." These were chemicals, advanced manufacturing, advanced materials and advanced business. Two more clusters – advanced logistics and biomedical/biotechnical – were described as "mature." All of these special categories are included in our targeted clusters except advanced business.

The classifications employed in the Commerce Department's plan are new and unique. A "star" is a sector that is already specialized and is increasing in local or regional predominance. A "mature" industry is one that is strong (highly concentrated) but no longer growing or increasing.

In addition, the arts, entertainment and recreation sector was identified as an "emerging" one, whose strength in the region is small but growing. This was linked most directly to efforts to establish the region as a venue for motor sports.

Table II.13
Indiana Strategic Plan Classifications
EGR 5 Industry Sectors

Sector/cluster	Status	Sector/cluster	Status
Advanced business services	Star	Chemicals	star
Advanced logistics	Mature	Earth products	emerging
Advanced manufacturing	Star	Educational services	transforming
Advanced materials	Star	Environmental technology	emerging
Agribusiness, food processing and technology	transforming	Forest and wood products	emerging
Arts, entertainment and recreation	Emerging	Information, communications, and media	emerging
Biomedical/biotechnical	Mature	Information technology	emerging

Source: Indiana Department of Commerce, Region 7 Strategic Plan for Economic Development, 2005.

The study concludes, "It appears that advanced materials, chemicals, advanced manufacturing, advanced business services along with advanced logistics and biomedical/biotechnical could all play important roles in region 7 [same as EGR 5] over the next 12 years."

Among its specific recommendations were the following:

1. Support the efforts of the Indy Partnership to target the motor-sports cluster with its identified linkages to advanced manufacturing, high technology and life sciences.
2. Work with the Indianapolis Convention and Visitors Association to attract conventions connected to targeted industry clusters. Current efforts in the life sciences sector can be duplicated for high-tech auto manufacturing, advanced logistics, motor sports and advanced business services.
3. Work with the Indy Partnership to identify possible tourism initiatives related to the motor sports-industry cluster.
4. Support the efforts of BioCrossroads and build on the current life-sciences strengths in biopharmaceuticals, medical devices and the developing areas of human/animal biotechnology.
5. Support the efforts of the Central Indiana Corporate Partnership and Purdue University to build advanced-manufacturing capacity and expertise.
6. Partner with the Center for Automotive Research to help position central Indiana as the center of creativity and research for the automotive sector.
7. Support the efforts of the regional transportation authority to develop the capability to do region-wide transportation planning to include highways, airports, high-speed rail, commuter transit and freight terminals.

The Central Indiana Corporate Partnership is striving to promote the logistics sector in the region. It has recommended the formation of an Indiana Distribution Logistics Council to advocate for the needs of the logistics sector.

7. Conclusions: The targeted sectors

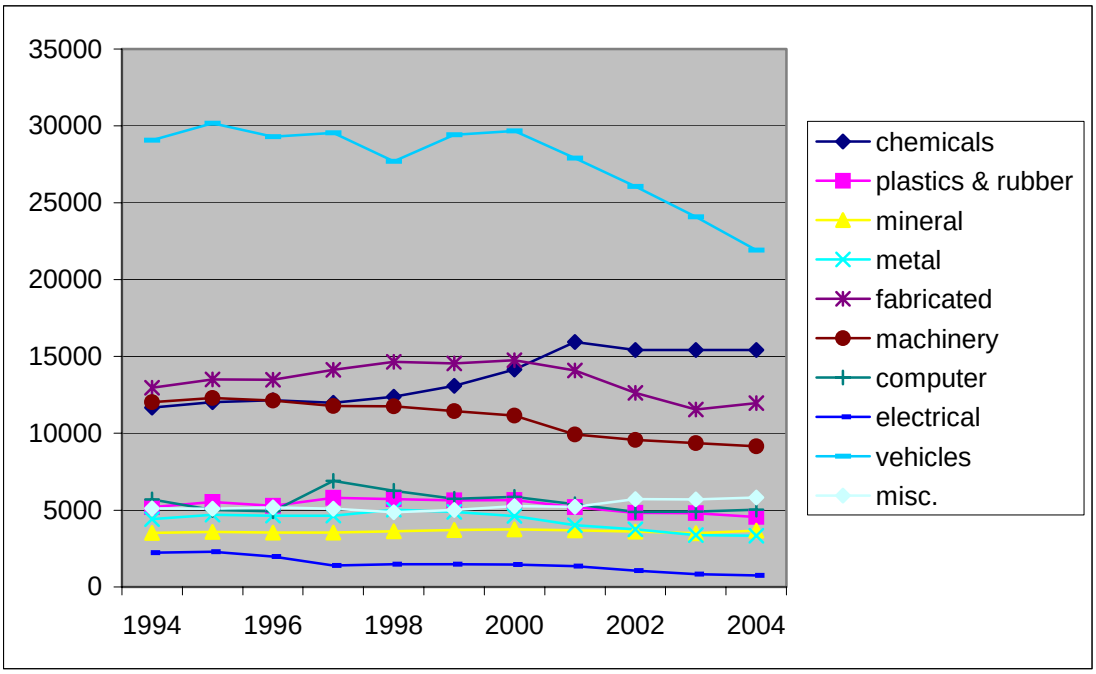
Following are more detailed descriptions of the four industry sectors and clusters that are chosen as the target industries for EGR 5. The four are not the top in all categories, but are most significant overall.

7.1 The advanced-manufacturing cluster

Advanced manufacturing is not necessarily about sophisticated products. It is the portion of manufacturing that is most committed to innovative practices. In terms of technology, advanced manufacturers tend to have more automation and robotics. In terms of management, advanced manufacturers are committed to Six Sigma, 5S, lean, kaizen or another of the many continuous-improvement regimens. By any means possible, they strive to reduce costs and waste while maintaining quality. In terms of product, advanced manufacturers typically produce a durable good – something that can be made anywhere and shipped to the consumer market. In practice, advanced manufacturing in EGR 5 includes the sectors shown in Table II.15.

These subsectors represent about 84 percent of all manufacturing jobs, as well as most of the best-paying manufacturing jobs. What is more, they represent the most volatile portion of manufacturing – perhaps the most volatile sector in the EGR 5 economy. Chart II.14 shows the 10-year trends of employment in manufacturing for EGR 5. Since the recession of 2001, no subsector has grown but the Miscellaneous Manufacturing category, which contains medical equipment. Of the two largest subsectors, transportation equipment has declined four straight years, and chemicals have been flat.

Chart II.14
Employment in Manufacturing Subsectors, 1994-2004



Source: QCEW from STATS Indiana

Our investigation of advanced manufacturing in EGR 5 shows that these trends are not expected to continue. Investment in manufacturing plants and equipment continues, as does new product research. The most important trend in advanced manufacturing – skills upgrade – is not apparent from the employment figures. Nearly every manufacturing worker is learning new skills and undertaking new responsibilities. Rather than simply tending machines, workers are learning how to calibrate and set them

up so that shorter batches can be run to meet exact customer demand. Rather than focusing narrowly on a single task, workers are encouraged to think about the whole production process and suggest ways to improve efficiency. Whether the method is Six Sigma or an old-fashioned suggestion box, workers today are asked to help run the company – and they know that the future of their jobs depends on it.

Table II.15 identifies the specific manufacturing industries that are included in the advanced-manufacturing category. Four-digit NAICS categories for which no regional employment exists are excluded. Our data analysis may overestimate the current size of advanced manufacturing in the region. Not all firms in each NAICS category are advanced, but we have included them in the tallies. Later phases of the Strategic Skills Initiative will give us opportunity to more clearly distinguish the advanced firms.

Table II-15
Advanced-Manufacturing Sectors

NAICS	Industry
3251	Basic chemical manufacturing
3252	Resin, synthetic rubber artificial and synthetic fibers and filaments manufacturing
3253	Pesticides, fertilizers and other agricultural chemical manufacturing
3254	Pharmaceuticals and medicine manufacturing
3255	Paint, coating and adhesive manufacturing
3259	Other chemical products and preparations manufacturing
3261	Plastic products manufacturing
3262	Rubber products manufacturing
3311	Iron and steel mills and ferro-alloy manufacturing
3312	Steel products from purchased steel
3313	Alumina and aluminum production and processing manufacturing
3314	Nonferrous metal except aluminum production and processing manufacturing
3315	Foundries
3321	Forging and stamping manufacturing
3322	Cutlery and hand tool manufacturing
3323	Architectural and structural metals manufacturing
3324	Boiler, tank, and shipping container manufacturing
3325	Hardware manufacturing
3326	Spring and wire products manufacturing
3327	Machine shops; turned product; and screw, nut and bolt manufacturing
3328	Coating, engraving, heat-treating and allied activities manufacturing
3329	Other fabricated metal product manufacturing
3331	Agricultural, construction and mining machinery manufacturing
3332	Industrial machinery manufacturing
3333	Commercial and service industry machinery manufacturing
3334	Ventilation, heating, air condition and commercial refrigeration equipment manufacturing
3335	Metalworking machinery manufacturing
3336	Engine, turbine, and power transmission equipment manufacturing
3339	Other general purpose machinery manufacturing
3341	Computer and peripheral equipment manufacturing
3342	Communications equipment manufacturing
3343	Audio and video equipment manufacturing
3344	Semiconductor and other electronic equipment components manufacturing
3345	Navigational, measuring, electronic, and control instruments

	manufacturing
3346	Magnetic and optical media manufacturing
3351	Electric lighting equipment manufacturing
3352	Household appliance manufacturing
3353	Electrical equipment manufacturing
3359	Other electrical equipment and component manufacturing
3362	Motor vehicle body and trailer manufacturing
3363	Motor vehicle parts manufacturing
3364	Aerospace product and parts manufacturing
3365	Railroad rolling stock manufacturing
3366	Ship and boat building manufacturing
3369	Other transportation equipment manufacturing
3391	Medical equipment and supplies manufacturing
3399	Other miscellaneous manufacturing

Training needed because of industry growth is a small part of the workforce challenge in advanced manufacturing in the near-term and for the coming five years. There will be new jobs, but the need to retrain workers in production technology is a greater issue. At present, only about 4,300 associate's degrees and skill certificates are issued for critical production skills in EGR 5 each year. Less than 1 percent of the region's production workforce is earning credentials annually.

7.2 The logistics cluster

The logistics cluster in EGR 5 comprises 11 distinct kinds of business. All are concerned with the transportation, storage and delivery of people and goods. The sectors are distinguished by the modes of transport: air, rail, water, ground, and pipelines. Water transport is insignificant in EGR 5, and the pipeline-transport sector is very small. Table II.16 names the subsectors in the logistics cluster.

Table II.16
Logistics Sectors

NAICS	Industry
481	Air transportation
4841	General freight trucking
4841	Specialized freight trucking
485510	Charter bus industry
486	Pipeline transportation
4881	Support activities for air transportation
4882	Support activities for rail transportation
4884	Support activities for road transportation
4885	Freight transportation arrangement
4889	Other support activities for transportation
492110	Couriers
492210	Local messengers and local delivery
4931	Warehousing and storage
541614	Process and logistics consulting services
561910	Packaging and labeling services

The strength of the logistics sector in EGR 5 lies with four sectors:

- General freight trucking
- Warehousing and storage
- Couriers
- Air transportation.

These four sectors contain 82.5 percent of all logistics employment in EGR 5. Each of the remaining sectors has smaller employment and a less-significant location quotient. The pipeline-transportation sector pays an exceptional wage of $71,183 but employs few people and it not subject to much improvement through regional or state initiative.

The logistics sector has few institutional or professional standards. Apart from the requirement that drivers of heavy trucks obtain a Commercial Driver's License, people may enter the sector and move up within the sector to better jobs without certifications or formal degrees. Only the top managers are expected to have degrees in management or other fields of study. The increasing sophistication of logistics management is evident in trends toward more education for the industry's workers. The Indiana University Kelley School of Business offers a master's degree in Global Supply Chain Management, while Ivy Tech Community College of Indiana offers an associate's degree in Logistics Management.

7.3 The health-care and biotechnology cluster

The region's health-care delivery system is very large, but is proportionally no greater than in other regions of the country. Our consultant's report cites recent growth at a rate slower than statewide or nationwide. This may indicate a weakness in the industry or simply that the burst of hospital expansions occurred earlier here than elsewhere. The forecast is for continued growth. The rate of growth in EGR 5 may be less than in other regions, but it will be greater than overall regional growth.

Table II-17
Health-Care and Biotechnology Sectors

NAICS	Industry
6211	Offices of physicians
6212	Offices of dentists
6213	Offices of other health care practitioners
6214	Outpatient care centers
6215	Medical and diagnostic laboratories
6216	Home health care services
6219	Other ambulatory health care services
6221	General medical and surgical hospitals
6222	Psychiatric and substance abuse hospitals
6223	Other hospitals
6231	Nursing care facilities
3345	Electronic instrument manufacturing
3391	Medical equipment and supplies manufacturing
3254	Pharmaceutical and medicine manufacturing
54138	Testing laboratories
54171	Physical, engineering and biological research
54169	Other technical consulting services

Medical manufacturing and bioscience research and development also are strong in EGR 5. The location quotient for medical manufacturing (NAICS 3254 and 3391) is 1.46, indicating strength and export status. Approximately 1,940 people work in the highly specialized field of bioscience research.

7,4 Automotive service and motor-sports cluster

Automotive service employment is connected to general economic demand and is expected to grow at the overall rate. This applies to the NAICS 8111 jobs. Automotive-parts manufacturing is volatile and is discussed above in section 7.1. The jobs in NAICS 711212 are expected to increase largely through economic development efforts at the state and regional level.

Table II-18
Automotive and Motor-Sports Sectors

NAICS	Industry
3362	Motor vehicle body and trailer manufacturing
3363	motor vehicle parts manufacturing
4231	Motor Vehicle, parts and supplies wholesalers
711212	Spectator sports -- racetracks
8111	Automotive mechanical and electrical repair and maintenance

Section III
Selection and definition of critical occupations and skill sets

The selection of critical occupations within each of the targeted industry sectors or clusters was accomplished through a lengthy process involving four consultants as well as the direct involvement of IPIC, the Interlocal Association (Circle Seven plus one) and the SSI lead team. Consultants evaluated each of the industries, considering the staffing patterns of those industries; numbers of workers in each occupation; wage rates; whether the occupation is concentrated in one industry or common to many; training requirements; and the position of the occupation in career ladders. Reports from the consultants were compiled by IPIC and summarized for the lead team, which assisted in the decisions. We looked on these consultant reports as resources to assist our process, rather than as the final word on the subject.

Our aim as workforce-development agents is to supplement and assist workers as they negotiate their way in the labor market. Therefore, our attention is drawn to entry- and mid-level jobs, particularly those that represent a step on a career ladder for workers in our community. The critical occupations we have chosen are (with the exception of registered nurses) jobs that require either on-the-job training or a certificate, or at most an associate's degree. We have looked at all of the following criteria in defining occupations as critical:

- Number of jobs in the target industry
- Number of jobs overall in the region
- Growth in the occupation
- Wages at the 10th, 50th and 90th percentiles
- Number of openings from replacement
- Hiring difficulties reported in ERISS survey
- Emerging skill sets

Most critical occupations exist in only one or two industries, and therefore do not have a large supply in the labor force. Those needed in every industry tend not to be in short supply. Office and administrative-support occupations (the SOC 43 occupations), for instance, are found in every kind of business. Our research shows these occupations tend to have brief periods of vacancy before jobs are filled. Even though some office and administration jobs have rapid turnover (as indicated in the ERISS Job Vacancy Survey), it appears that critical shortages rarely exist with these occupations except when they are very specialized in one or two industries.

1. Wages for critical occupations

Table III.1 displays wage levels for the largest occupations in each of the targeted industries. The compensation level is shown for three intervals: the 10th percentile, 50th percentile and 90th percentile.[10] Not all the selected occupations are high-wage jobs, but there is a mix of high-wage and low-wage jobs for each industry.

[10] The ordinary practice of reporting wages in terms of the average or median is not sufficient for a good analysis of an occupation. The average wage is just one point in a distribution of wages. Unless we know something about that distribution, the average tells us very little. The 10th percentile shows the lowest rate that workers in the occupation make. It is tantamount to the entry-level wage. The 90th percentile shows the possibilities for workers who stay at the job and excel in it. Some jobs have an exceptional high-end possibility despite an ordinary average wage. We looked for occupations in which the 90th percentile was at least twice the 10th percentile wage.

Table III.1a
Health Care Critical Occupations

SOC	Occupation	10th	50th	90th
29-1111	Registered nurse	18.31	23.64	31.27
29-2000	Allied health professional[11]	12.40	16.47	23.62
29-2011	Medical and clinical laboratory technologist	14.93	20.37	26.50
29-2034	Radiologic technologist	14.67	19.08	25.25
29-2041	Emergency medical technician	8.49	11.11	16.71
29-2052	Pharmacy technician	9.01	11.83	15.28
29-2061	Licensed practical nurse	13.16	17.54	23.34
29-2071	Medical records technician	9.10	11.52	17.27
31-1011	Home health aide	7.46	9.92	13.28
31-1012	Nursing aide, orderly and attendant	7.97	10.16	13.10
31-9092	Medical assistant	9.29	12.36	16.65

Source: egr5occupations.xls

Table III.1b
Automotive Service Critical Occupations

SOC	Occupation	10th	50th	90th
49-1011	First-line supervisor/manager	13.08	22.06	40.04
49-3021	Automotive body and related repairer			
49-3023	Automotive service technician	9.21	16.32	29.28
49-3031	Bus and truck mechanics and diesel specialists	12.82	19.09	30.92
49-3042	Mobile heavy equipment mechanics, except engines	13.10	18.03	23.05

Source: egr5occupations.xls

Table III.1c
Advanced Manufacturing Critical Occupations

SOC	Occupation	10th	50th	90th
49-9041	Industrial machinery mechanic	14.79	23.02	32.79
51-1011	First-line supervisors/manager	14.39	22.34	36.18
51-2092	Team assembler	8.97	13.50	25.53
51-4000	Machine operator [11]	10.61	16.81	25.09
51-4011	CNC machine operator	8.66	16.78	26.25
51-4031	Cutting, punching and press machine	8.29	14.52	25.80
51-4041	Machinist	14.79	23.02	32.79
51-4111	Tool and die maker	16.77	27.36	33.28
51-4121	Welder	10.07	14.34	25.05
51-9011	Chemical equipment operator	12.04	14.83	16.66
51-9061	Inspectors, testers and weighers	9.85	16.30	27.05
51-9111	Packaging and filling machine operator	8.22	12.01	17.53

Source: egr5occupations.xls

[11] Data for allied health professional and for machine operator in these and subsequent tables are the unweighted average of all the occupations included in the group definition.

Table III.1d
Logistics Critical Occupations

SOC	Occupation	10th	50th	90th
53-1031	First-line supervisor/manager	12.64	20.58	37.17
53-3032	Truck driver, heavy and tractor trailer	11.30	18.56	25.50
53-3033	Truck driver, light and local delivery	7.75	12.27	21.62
53-7051	Industrial truck and tractor operator	9.67	12.98	19.96
53-7062	Laborer and freight, stock and material movers, hand	7.43	10.52	17.57
53-7064	Packer and packager	6.79	9.56	13.00

Source: egr5occupations.xls

2. Occupational Growth Projections

Table III.2 shows occupational growth projections for the interval from 2002 to 2012. "Annual growth" shows the job opportunities that occur because of growth in the industry. For example, if a hospital increased employment by 100, about 15 new jobs for nurses would result. "Annual turnover" shows the job openings created when a worker retires or otherwise leaves a job. Note that some occupations are italicized, indicating that these occupations are difficult to fill, according to respondents to the recent ERISS Job Vacancy Survey.

In each of the following charts, the value for annual growth is the difference between the 2002 and 2012 employment estimates, divided by the 10 (years). These values are accepted from the egr5projections.xls spreadsheet. The annual turnover value is calculated from the turnover value for EGR 5 provided in the Census Bureau Longitudinal Employer-Household Dynamics database. This source shows turnover to be much higher than indicated in the spreadsheet. The turnover values vary by industry and are as follows: health care, 8.9 percent; repair services, 11.4 percent; logistics, 9.5 percent; and manufacturing, 6.5 percent.

Table III.2a
Health-Care Critical Occupations

SOC	Occupation	2002 Employment	2012 Employment	Annual Growth	Annual Turnover[12]
29-1111	*Registered Nurse*	14,900	17,980	308	1326
29-2000	Allied health professional	11,870	14,570	270	1950
29-2011	Medical and clinical laboratory technologist	1,440	1,820	38	128
29-2034	Radiologic technologist	1,080	1,260	18	96
29-2041	Emergency medical technician	1,010	1,120	11	90
29-2052	*Pharmacy technician*	2,190	2,550	36	195
29-2061	*Licensed practical nurse*	4,950	5,560	61	440
29-2071	Medical records technician	1,110	1,630	52	99
31-1011	Home health aides	1,920	2,500	58	171
31-1012	*Nursing aide, orderly and attendant*	7,890	9,180	129	702
31-9092	Medical assistant	2,290	3,630	134	204

Source: egr5projections.xls

[12] Estimates of turnover rates are based on recent regional estimates of turnover from the Census Bureau Longitudinal Employer-Household Dynamics dataset. These data are particular to the region and to the industry. They generally are much higher than those provided in the recommended source.

Table III.2b
Automotive-Service Critical Occupations

SOC	Occupation	2002 Employment	2012 Employment	Annual Growth	Annual Turnover
49-3021	Automotive body and related repairer	1,340	1,380	4	153
49-3023	Automotive-service technician	5,330	5,680	135	608
49-3031	Bus and truck mechanic and diesel specialist	2,540	2,730	19	289
49-3042	Mobile Heavy Equipment Mechanic, Except Engines	1,180	1,270	9	135

Source: egr5projections.xls

Table III.2c
Logistics Critical Occupations

SOC	Occupation	2002 Employment	2012 Employment	Annual Growth	Annual Turnover
53-1031	*First-line supervisor/manager*	2,250	2,380	13	214
53-3032	*Truck driver, heavy and tractor trailer*	14,070	16,020	195	1337
53-3033	Truck driver, light and local delivery	5,640	6,090	45	536
53-7051	*Industrial truck and tractor operator*	5,400	5,890	149	513
53-7062	Laborer and freight, stock and material mover, hand	16,430	16,530	110	1561
53-7064	Packer and packager	9,540	10,680	2,930	

Source: egr5projections.xls

Table III.2d
Advanced-Manufacturing Critical Occupations

SOC	Occupation	2002	2012		Openings	
		IDWD	IDWD	BLS	IDWD	BLS
49-9041	*Industrial machinery mechanic*	1,020	972	1,090	210	328
51-1011	*First-line supervisors/manager*	5,480	5,224	5,857	1,150	1,783
51-2092	Team assembler	9,350	8,914	9,994	2,420	3,500
51-4000	*Machine operator*	15,880	14,120	16,912	390	1,422
51-4011	*CNC machine operator*	860	820	919	140	239
51-4031	Cutting, punching and press machine	2,240	2,136	2,394	520	779
51-4041	*Machinist*	3,980	3,794	4,254	930	1,390
51-4111	*Tool and die maker*	1,220	1,163	1,304	280	421
51-4121	*Welder*	2,240	2,136	2,394	630	889
51-9011	Chemical equipment operator	3,290	2,584	2,897	870	1,183
51-9061	Inspector, tester and weigher	3,950	3,766	4,222	900	1,356
51-9111	Packaging and filling machine operator	2,460	2,345	2,629	490	774

Source: egr5projections.xls and , BLS

Table III2d presents an alternative view of the manufacturing occupations. The IDWD forecast calls for declines in manufacturing employment. The only openings under this scenario are from replacement of workers who retire or quit. But under a growth scenario based on the BLS forecast, there also would be new jobs from industry expansion. Table III.2d compares these two scenarios. The base employment for each occupation in 2002 is shown, as are two different numbers for 2012 based on the alternative forecasts. Under the heading of “openings” are two estimates of the number of job openings. The IDWD

column indicates only the expected openings from replacement, as indicated in the *egr5estimates.xls* dataset. The "Openings-BLS" column indicates the sum of openings from replacement *and* growth.

3. Critical Occupations

It is difficult to make the final selection of a few critical occupations out of a large and complex economy. Our recommendations based on data research were substantially revised after we talked with regional employers and experts.

Automotive and Motor-Sports Critical Occupations

SOC	Occupations
49-3023	Automotive-service technician and mechanic
51-4041	Machinist

Health-Care and Biotechnology Critical Occupations

SOC	Occupation
29-1111	Registered nurse
29-2000	Allied health professional
29-2061	Licensed practical and licensed vocational nurse
31-1012	Nursing aide, orderly and attendant

Advanced-Manufacturing Critical Occupations

SOC	Occupation
51-4000	Machine operator
51-4121	Welder
51-9061	Inspector, tester
51-9011	Chemical equipment operator

Logistics Critical Occupations

SOC	Occupation
53-1031	First-line supervisor/manager of transportation workers
53-3032	Truck driver, heavy and tractor-trailer
53-7062	Laborer and freight, stock, and material mover, hand

"Allied health professional" is a summary occupation class that includes medical- and clinicallaboratory technicians and technologists, dental hygienists, cardiovascular technologists, diagnostic-medical sonographers, nuclear-medicine technologists, radiologic technologists, dietetic technicians, pharmacy technicians, psychiatric technicians, respiratory-therapy technicians, surgical technicians, medical records- and health-information technicians and all other health technologists and technicians. These diverse professions share several features. Practitioners work under the direction of a licensed physician, dentist, pharmacist or other licensed practitioner. They are usually trained in the operation of specialized machinery to analyze or diagnose patients' condition or to treat it after a doctor's diagnosis.

The amount of training required for these occupations varies. On-the-job training or a certificate is the minimum requirement for medical- and clinical-laboratory technicians, dental hygienists, cardiovascular technologists, nuclear-medicine technologists, radiologic technologists, psychiatric technicians and

surgical technicians. An associate's degree is required for diagnostic-medical sonographers, respiratory therapy technicians, and medical records- and health-information technicians, and is preferred for surgical technicians, psychiatric technicians, radiologic technologists, nuclear-medicine technologists, cardiovascular technologists, dental hygienists and medical- and clinical-laboratory technicians. Medical- and clinical-laboratory technologists are required to have a bachelor's degree. A bachelor's degree is also profitable for dental hygienists, cardiovascular technologists, diagnostic-medical sonographers, nuclear-medicine technologists and radiologic technologists. Dental hygienists also may obtain a master's degree.

Machine operators includes computer-controlled machine tool operators; numerical tool and process control programmers; extruding and drawing machine operators; forging machine operators; rolling machine operators; cutting, punching and press machine operators; drilling and boring machine tool operators; grinding, lapping, polishing and buffing machine operators; lathe and turning machine tool operators; milling and planing machine operators; machinists; model makers; pattern makers; molding, coremaking and casting machine operators; multiple machine tool operators; tool and die makers; plating and coating machine operators; tool grinders, filers and sharpeners; and all other metal and plastic workers. Most machine operators historically performed simple, repetitive tasks. This is changing as advanced manufacturing becomes more flexible and workers often must calibrate their equipment to produce parts to new specifications. The majority of machine operators can learn through apprenticeship or on-the-job training, although the most skilled operators will require five or six years of education and training. Technical and vocational schools also provide education for some types of machine operators.

4. Requirements

The requirements of education, certification, training and experience vary for the occupations described here. Requirements vary substantially from one employer to another, so there cannot be a single list of requirements except for those that are legally mandated. Here is a very brief categorization of the training requirements for the occupations.

Occupations requiring a bachelor's degree

- Registered nurse
- Allied health professional

Occupations requiring an associate's degree

- Automotive service technician
- Registered nurse
- Allied health professional

Occupations requiring post-secondary certification including apprenticeship

- Licensed practical nurse
- Allied health professional
- Nursing aide, orderly and attendant
- Welder
- Machine operator
- Machinist
- Truck driver, heavy and tractor-trailer

Occupations requiring only on-the-job training

- First-line supervisor/manager
- Machine operator
- Laborer and freight, stock and material mover, hand

The manufacturing sector also has an emerging skill-set classification. Because production workers are becoming more than machine tenders, they now need more understanding of the entire process, the working of their machine and the qualities of the material they are working on. These skills are categorized by the Occupational Information Network as systems analysis and systems evaluation. The bundle of training and skill that fit together in this new, more robust, production worker are termed "industrial production technician" by the national Manufacturing Skill Standards Council. The industrial production technician is an enhanced-production worker with additional training in production-process technology. The training of the industrial production technician will enable him or her to assist management in efficiency programs. In addition, the technicians will have more ability to maintain any of the production machines that are ordinary to manufacturing. Curricula for the certificate for the industrial production technician have been developed by the Manufacturing Skills Standards Council and are being adapted to coursework by Ivy Tech Community College of Indiana. The need to equip a substantial portion of EGR 5's production force with this training represents one of the greatest workforce challenges to the region.

Section IV
Size and location of short- and long-term occupational shortages

In advance of this report's ultimate task – quantifying occupational shortages – we need to understand some of the features of our region. EGR 5's ability to meet its workforce demand in the years to come depend on its population and labor force participation rates, as well as the potential for new workers to enter the region.

EGR 5 comprises nine Indiana counties: Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan and Shelby. The grouping of these nine counties is a new one, reflecting the expansion of metropolitan Indianapolis.

Population

The population of EGR 5 is younger than that of the general state population of Indiana and contains a larger share of working-age adults. Table IV.1 displays and compares the populations of EGR 5 and Indiana for six age categories. Two age-cohort groups (25-44 and 45-64) are of special interest, for they constitute the prime working-age share of the population. The table shows that 57 percent of EGR 5's population is in this group, compared with 52.5 percent for the state.

Table IV.1
EGR 5 and Indiana Population, by Age Group, 2004

Age Group	EGR 5	Indiana
Total	1,719,603 (27.5%)	6,245,413
0-4	130,638 (29.9%)	437,003
5-19	362,687 (27.1%)	1,338,745
20-24	102,276 (23.9%)	426,735
25-44	529,828 (30.3%)	1,746,778
45-64	410,411 (26.7%)	1,535,424
65+	183,763 (24.2%)	760,728

Source: Census Bureau

Two age cohorts within EGR 5's population are smaller than the statewide rate. These are 20-24 and 65+. These two groups correspond with the college-attenders' age group and that of retirees. Because a larger share of EGR 5's population is of working age, the region could be expected to have higher rate of jobs per population than the state of Indiana. The following section confirms that it does.

Jobs-to-population ratio

EGR 5 has 27.5 percent of the state's population and 30 percent of the state's jobs. There are 49.8 jobs per 100 people in EGR 5, compared to 45.6 jobs per 100 people in Indiana. This difference might be partly explained by the greater share of working-age people in EGR 5. But the data show that participation also is higher in the working-age cohort. Among people ages 25 to 64, EGR 5 has 91.1 jobs

per 100 people – more than the 86.8 per 100 across the state of Indiana. It is not simply that there are more prime-age adults in EGR 5, but also that they participate in the labor force at a higher rate.

Migration

EGR 5 has grown through migration during the past five years. All counties but Madison and Shelby had net in-migration between 2000 and 2004. Growth from in-migration has been phenomenal in Hamilton and Hendricks counties (33,623 and 15,113, respectively), and more moderate in Boone, Hancock, Johnson, Marion and Morgan. Overall, the region received a population boost of 61,910 between 2000 and 2004. This is more than twice the in-migration to the whole state of Indiana during the same interval of time. We conclude, therefore, that most of the in-migration to EGR 5 was Hoosiers moving into the region from other corners of the state. If these in-migrants were primarily young adults entering the region for employment opportunities, the strength of the 25-44 age cohort discussed above is explained.

Because wages in Indiana and EGR 5 are lower than in other regions of the country, we do not expect that migration from out-of-state will occur in great numbers. Historically Indiana has drawn relatively few immigrants and that trend will continue. Only in the low-wage, entry-level positions are immigrants from outside the United States expected to play a significant role in the labor supply in years to come.

Commuting

The high participation rate in the labor market in EGR 5 occurs partly because of workers coming into the region from surrounding counties. EGR 5 is a destination for workers – importing more than it exports. The pattern is clearest for Marion County, which employs 190,506 people who reside in other counties (2003 data). Eighty-five percent of these enter Marion County from contiguous counties within EGR 5, leaving about 15 percent (26,980 people) working in Marion County and living outside EGR 5. With this high number of commuters already entering the region, commuting may have nearly reached its limit. Our projections for labor supply in the critical occupations show only small levels of increased commuting.

Table IV.1 shows that the region's supply of college-age adults and school-age children is small relative to the region's workforce. This means that current population alone cannot sustain the economy at its current levels in future years.

The greatest on-going source of new workers may be migrants from Latin America and the Far East. These workers, especially Hispanics/Latinos, were praised repeatedly by regional employers. Some employers in warehousing indicate that their workforce is already 50 percent Hispanic/Latino. Although language is a problem, immigrant workers are said to have a good work ethic and the willingness to accept offered wages.

Small Business, Large Business

The Simple Business Lookup database lists 59,480 businesses for EGR 5. The great majority of these are small and part-time sales operations. Setting those micro-enterprises aside, there are more than 16,000 businesses employing 10 or more employees in EGR 5. The manufacturing sector has 2,536 businesses, including 1,620 in the advanced-manufacturing subsectors. More than 1,100 businesses are in the transportation sector, from small trucking services to the largest employer in the sector – the Indianapolis International Airport. There are more than 150 medical clinics and hospitals and hundreds of doctors' offices. Even the small and specialized motor sports sector has more than 800 businesses.

The region is simply too vast to list all the companies in the region. The following table indicates the region's businesses by size.

Table IV.2
Size of Businesses, EGR 5

Industry		< 20 employees	20-100 employees	>100 employees
	All industries	50,271	6,718	1,345
31-33	Manufacturing	1,780	497	60
336	Transportation equipment	49	10	18
48-49	Transportation and warehousing	887	202	50
622	Hospitals	73	34	62

Source: Simple Business Lookup database

As the table shows, most businesses of every kind are small, employing fewer than 20 employees. Such businesses often have no personnel department and little expertise in working through the labor market. Assisting small businesses with personnel and hiring is one strategy of assisting the labor market. At the other extreme lie the very large companies. These typically have effective strategies for hiring. The following list contains some of the region's large employers:

- Amtrak
- Chataqua Airlines
- Community Health Network
- Covance Central Lab Service
- Eli Lilly and Co.
- Elsa Corp.
- Federal Express
- GM Truck and Bus
- Hancock Memorial Hospital
- Hendricks Community Hospital
- Indiana Precision Technology
- International Truck and Engine
- Johnson Memorial Hospital
- King Systems
- Meridian Automotive Systems
- Metal Fabricating Division
- Methodist Hospital
- Mitsubishi Heavy Industries
- Pk USA
- Raytheon Technical Services
- Rexnord Link Belt
- Riverview Hospital
- Roadway Express
- Roche Diagnostics
- Rolls Royce Corp.
- Ryobi Die Casting USA
- St. Francis Hospital and Health
- St. John Health System
- St. Vincent Hospital and Health
- Utc/Carrier
- Visteon Corp.
- Wishard Health/Services
- Yellow Transportation

Occupational supply and shortages

Quantifying the gap between demand and supply for a given occupation is, even in the best circumstances, guesswork. As noted above, we do not know how the industries are going to perform, and in the cases of advanced manufacturing and automotive and motor sports, estimates conflict.

Because staffing-patterns data are well-documented, we are confident in our estimates of the occupational structure of each industry. An individual firm may vary from the staffing-patterns estimates, but the industry overall will come close to the staffing-patterns values. We suspect that the staffing-patterns data are less good for manufacturing firms, however. This is because many firms in EGR 5 are branches of larger corporations. The office functions of these companies are performed elsewhere, and the jobs in our region probably consist of a larger share of production workers than the staffing-patterns data suggest.

The supply side of our estimates are shakier. We are fortunate to have recent data on education and training from the Indiana Commission for Higher Education. But these data are difficult to use for three

reasons. First, Indiana's universities and proprietary institutions do not report graduations uniformly. Two different schools may provide similar training under two different titles, classified by two different CIP codes. Second, some institutions do not cooperate with the Indiana Commission for Higher Education in its efforts to compile records. Third, the number of graduates from local or regional institutions does not determine the supply of workers since many of them will leave the region and work elsewhere while people from elsewhere come into the region for work. Consequently, estimating occupational shortages is not a task for the faint of heart.

Vacancies and Occupational shortages

This section contains estimates of vacancies and net shortages for occupations in the four key industries. The estimates are derived from a combination of sources, including the ERISS Job Vacancy Survey, consultants' reports and information supplied by the Indiana Department of Workforce Development, Office of Career and Technical Education. The information from these sources was used to make estimates that were entered into the supply side worksheets to produce the values shown here. Although mathematical calculation was used to produce these values, we stress that they are estimates. Consortium member representing all four industries have affirmed our conclusions but say the values shown in the source data underestimate openings in the region.

Table III.2a
Healthcare Estimated Vacancies

SOC	Occupation	annual openings	Annual supply	Annual Shortage
29-1111	*Registered Nurse*	1,634	579	1,055
29-2000	*Allied health professionals*	2,220	799	1,421
29-2061	*Licensed practical nurse*	501	414	86
31-1012	*Nursing aide, orderly and attendant*	831	48	783

The number of nurses graduated statewide in a recent year was 1,930.[13] This number is more than EGR 5's annual vacancies, but the region cannot command the entire pool of new nurses. A sizeable share of new graduates from Indiana universities are out-of-state students who immediately return to their home state upon graduating, and a further share live outside the region. If we assume that 30 percent of statewide graduates will be attracted to EGR 5 (based on our share of all statewide employment) then the number of annual graduates coming into the region would be 579. That would leave an annual shortage of 1,055 nurses. The rate of turnover and dropout among nurses is very high, leaving chronic vacancies in many areas. All three types of nurses are among the top five occupations having chronic vacancies in the statewide ERISS Job Vacancy Survey.

Table III.2b
Automotive Service Estimated Vacancies

SOC	Occupation	Annual openings	Annual supply	Annual Shortage
49-3023	Automotive service technician	743	202	540
49-3041	Machinist	397	28	369

[13] Indiana State and Regional Health Industries – A Workforce Gap Analysis, Thomas P. Miller and Associates, October 2005.

Lincoln Technical Institute is the primary source of new talent in the automotive-service area. In a recent year, Lincoln Tech graduated 675 master certified automotive service technicians. Again, this talent pool is not a local resource but a state one, and EGR 5 might capture 30 percent of the total.

Table III.2c
Logistics Estimated Vacancies[14]

SOC	Occupation	Annual openings	Annual supply	Annual Shortage
53-1031	*First-line supervisor/manager*	227	114	113
53-3032	*Truck driver, heavy and tractor trailer*	1,532	720	812
53-7062	Laborer and freight, stock and material mover, hand	3,000	2,400	600

There are as many as 10 institutions in the region that provide training for the commercial driver's license. These institutions can train about 60 drivers per month. What portion of the available slots are taken is unknown. The remaining two occupations in this cluster are unskilled, entry-level jobs. With 40,000 unemployed persons in the region, the supply of workers capable of filling these positions exists but the vacancies persist. We believe this is because of work-readiness deficiencies in the labor pool. Occupations such as laborer do not require particular training, but do require certain competencies among workers that are lacking in the pool of applicants.

Table III.2d
Advanced-Manufacturing Estimated Vacancies[15]

SOC	Occupation	Annual openings	Annual supply	Annual shortage
51-4000	*Machine operator*	2,454	1,963	491
51-4121	*Welder*	234	100	134
51-9061	*Inspector, tester, sorter and weigher*	1,613	1290	322
51-9011	*Chemical equipment operator*	1,397	1300	97

Manufacturing employers conduct extensive training for their new hires, including both applied job skills and general education. The supply of workers for positions such as welding contains both well-trained individuals and other who are raw and unprepared. If all the remedial training that is done after the hire were done by public institutions to prepare workers before the hire, the supply would increase vastly.

[14] Some data provided by logistics industry representatives and consortium members.
[15] The values shown for annual vacancies reflect our growth estimate based on the BLS forecast. All others assume the IDWD growth rates.

Section V
Location and significance of critical skills gaps

Four skill sets are emphasized by two or more of the critical occupations. These skill sets cut across occupations and industries. Each is discussed separately.

Leadership

Although individuals with job experience are usually selected for positions of leadership on the shop floor, these individuals do not necessarily have a clear understanding of leadership. These first-line supervisors suddenly are required to demonstrate knowledge and perform new tasks including:

- Calculate labor and equipment requirements and production specifications
- Confer with management and subordinates to resolve problems
- Confer with supervisors to coordinate operations and activities between departments
- Demonstrate equipment to new employees
- Direct activities of employees
- Enforce safety regulations
- Inspect materials and check results
- Prepare, compile and submit reports
- Plan and establish work schedules, assignments and sequences of operations.

None of these skills is inherent in the work the individual performed previously, and very few operations workers have previous training in management or supervision.

The need for development of leadership qualities is found in advanced manufacturing, automotive, and logistics. All three industries employ individuals in the role of first-line supervisor, an occupation that is known variously as foreman, shift leader, team leader and other names. The same need also may be felt in hospitals when a shift nurse takes the position of director of nursing or the role of head nurse for a shift.

English

The second skill set is proficiency in the English language. As immigrants become a more important part of the workforce of EGR 5, their language capabilities are a greater issue. English-language assistance is needed for laborers, team assemblers and other occupations that are common in manufacturing plants and in warehouses and courier operations.

Production Technology

The emerging skill standards for advanced manufacturing have taken shape under the guidance of the Manufacturing Skill Standards Council. The certificate for manufacturing production technician emphasizes four areas of skill and knowledge:

- Quality practices and continuous improvement
- Maintenance awareness
- Safety
- Manufacturing processes.

The production technician certificate is not intended for a single specific occupation, but to enhance the understanding and competence of every kind of production worker.

Nursing Skills

Three of the critical occupations are nursing or patient care occupations. Although these occupations vary in their degree of study, all require similar fundamental skills, including:

- Measuring and recording patient's vital signs, food intake and symptoms
- Providing basic patient care
- Maintaining accurate, detailed reports and records.

Work Readiness

EGR 5 had more than 40,000 unemployed people in September 2005. The gap between jobs and idle workers is caused not by available people but by work-readiness issues. Occupations such as laborer, team assembler and industrial truck and tractor operator can be performed by a majority of those unemployed individuals, yet the jobs are hard to fill and have a high rate of turnover. This critical skill set is needed in every entry-level position that is hard to fill, including team assembler, industrial truck and tractor operator, laborer, etc.

Section VI
Regional consortium and industry-partner engagement

Prior to the Strategic Skills Initiative being announced in June, the Indianapolis Private Industry Council Inc. started to discuss conducting a labor market information study in fall 2004. Ultimately, a decision was made to study four sectors, and a request for proposals was issued in March 2005 seeking experts to study advanced manufacturing, automotive and motor sports, life sciences (an update of the health care gap analysis conducted for the Indiana Health Industry Forum in 2003) and logistics. Selection of the four sectors was based on careful research and evaluation of various sources of data, including the Indiana Economic Development Council's Regional Snapshot and its 2005 Strategic Plan for Economic Development. The IEDC 2005 strategic plan indicated that the four sectors IPIC selected were in the state's Top 10 list of growing sectors. While many studies were conducted, none of them dug deep enough into addressing the workforce development's needs of the central Indiana region.

To have a regional approach, IPIC chose to include the nine counties that now make up EGR 5: Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan and Shelby. This way, IPIC could share the information with a fellow Workforce Investment Board, the Interlocal Association (Circle 7 plus one) and collaborate on addressing the workforce-development needs of the central Indiana region.

The regional sectors selected contain a variety of occupations that represent strong employment demand and provide good wages. Over the past six months, many regional industry representatives from the four sectors were interviewed and convened to discuss initial findings. Some of those industry representatives also are part of the EGR 5 regional consortium and continue to participate as part of the SSI process. For example, EGR 5's consortium members involved in the development of our Occupation and Skills Shortages Report include private industry representatives, local economic development officials, local training providers, representatives of higher education and others.

The research process involved many points of contact with regional experts, employers and workers. An effort was made to include small employers as well as large, and to reach to all nine counties. Here is an outline of the events that allowed us to learn from the community:

- Logistics roundtable with 35 participants
- 18 interviews with representatives of leading logistics industry employers
- Life sciences meeting involving industry, associations and educational institutions
- 10 interviews with automotive and motor sports experts
- Two focus groups with four advanced manufacturers
- 20 site visits and interviews with advanced manufacturers.

Now that our four industry sectors have been selected and we must move to a discussion of root causes, we will continue to evaluate our consortium membership so that it is truly representative of the industries selected. We also want to ensure that those engaged focus on translating skills into bottom-line dollars and cents and that they have a keen understanding of the concept of "line of sight" so that we can develop solutions to the causes we discover.

As part of the development of our Occupation and Skills Shortages Report, EGR 5 held a lead team meeting and consortium meeting. In addition, we solicited lead-team input at various junctures in the development of the draft report. Once the draft report was distributed, staff provided consortium members with the opportunity to meet with them one-on-one or via conference call to go over questions or concerns they had. EGR 5 is continuing to improve our coordination and communication with biweekly e-mail updates, progress reports about the planning grant and publication of meetings proposed for the remainder of the SSI planning process.